



**TRANSMITTAL LETTER**  
**(General - Patent Pending)**

Docket No.  
9872

In Re Application Of: Ted Christopher

Serial No.  
08/746,360

Filing Date  
November 8, 1996

Examiner

Group Art Unit

Title: **FINITE AMPLITUDE DISTORTION-BASED INHOMOGENEOUS PULSE ECHO ULTRASONIC IMAGING**

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Transmitted herewith is:

**Information Disclosure Statement**  
**Form PTO-1449**

in the above identified application.

- ☒ No additional fee is required.
- ☐ A check in the amount of \_\_\_\_\_ is attached.
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- ☐ Charge the amount of \_\_\_\_\_
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Signature

Dated: **January 31, 1997**

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PATENTS

UNITED STATES PATENT AND TRADEMARK OFFICE  
Applicant: Christopher  
Serial No.: 08/746,360  
Filed: November 8, 1996  
For: Finite Amplitude Distortion-  
Based Inhomogeneous Pulse  
Echo Ultrasonic Imaging  
Examiner: J. D. S.  
Art Unit: 6/30/97  
Docket: 9872  
Dated: January 31, 1997

Assistant Commissioner for Patents  
Washington, DC 20231

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GROUP 3300

INFORMATION DISCLOSURE STATEMENT

Sir:

Applicant submits herewith, as attachments to Form PTO-1449, copies of information which is considered to be pertinent to the invention as claimed in the above-identified application. In particular, Applicant is submitting herewith copies of the following documents:

1. "Second Harmonic Imaging and Harmonic Doppler Measurements With Alburnex," Chang, et. al., 1994 Ultrasonics Symposium, pp. 1551-1554.
2. "In Vivo and In Vitro Ultrasound Beam Distortion Measurements of a Large Aperture and a Conventional Aperture Focussed Transducer," Moshfeghi, et. al., Ultrasound in Med & Biol., Vol.14, No.5, pp. 415-428, 1988.
3. "Physical Acoustics: Ultrasonic Techniques," Makin, J. Acoust. Soc. Am. Vol. 97, No. 5, Pt. 2, May 1995.
4. "Generation of harmonics in a focused Gaussian sound field," Du, et. al., J. Acoust. Soc. Am. 97 (3), pp 1486-1488, March 1995.

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8(a)

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, DC 20231 on January 31, 1997.

Dated: January 31, 1997

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5. "Nonlinear Propagation in Doppler Ultrasound," McDicken, et. al., Ultrasound in Med & Biol., Vol.19, No. 5, pp 359-364, 1993.
6. "Multi-frequency transducer assembly for nonlinear ultrasonic measurements," Wu, et. al., J. Acoust. Soc. Am. 93 (4), Pt. 1, pp. 2231-2234, April 1993.
7. "Errors in attenuation measurements due to nonlinear propagation effects," Zeqiri, J. Acoust. Soc. Am. 91 (5), pp. 2585-2593, May 1992.
8. "Harmonic generation in finite amplitude sound beams from a rectangular aperture source," Kamakura, et. al., J. Acoust. Soc. Am. 91 (6), pp. 3144-3151, June 1992.
- ✓9. "The Enhancement of Second Harmonic Generation In Ultrasonic Microscopic Observation By Triple Transition," Din, et al., 1993 Ultrasonics Symposium, pp. 575-578.
- ✓10. "Non-Linearity and finite amplitude effects," European Journal of Ultrasound, 1 pp. 213-215, 1994.
- ✓11. "Time-shift compensation of ultrasonic pulse focus degradation using least-mean-square error estimates of arrival time," Liu, et al., The Journal of the Acoustical Society of America, Vol. 95, No. 1, pp. 542-555, January 1994.
- ✓12. "Adaptive focusing in scattering media through sound-speed inhomogeneities: The van Cittert Zernike approach and focusing criterion," Mallart, et. al., J. Acoust. Soc. Am. 96 (6), pp. 3721-3732, December 1994.
- ✓13. "Wavefront amplitude distribution in the female breast," Zhu, et. al., J. Acoust. Soc. Am. 96 (1), pp. 1-9, July 1994.
- ✓14. "An experimental investigation of the nonlinear pressure field produced by a plane circular piston," TenCate, J. Acoust. Soc. Am. 94 (2), Pt. 1, pp. 1084-1089, August 1993.
- ✓15. "New approaches to nonlinear diffractive field propagation," Christopher, et. al., J. Acoust. Soc. Am. 90 (1), pp. 488-499, July 1991.
16. "Imaging the Acoustic Nonlinearity Parameter with Finite-Amplitude Sound Waves: The Difference-Frequency Method and the Second-Harmonic Method," Nakagawa, et. al., IEICE Transactions, Vol. E 71, No. 8, pp. 799-809 August 1988.

Respectfully submitted,

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